REMARKS / ARGUMENTS

For the convenience of the Examiner and clarity of purpose, Applicant has reprinted the substance of the Office Action in ***10-point bolded and italicized font.*** Applicant's arguments immediately follow in regular font.

> ***1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter of claims 12 and 14 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.***

New figures 6 and 7 are presented to illustrate the subject matter disclosed in, for example, paragraph [0023] and original claims 12 ad 14. Claims 12 and 14 are supported by paragraph [0023] and these figures. It is Applicant's intent that no new matter be added by figures 6 and 7. Applicant submits that the new sheet of drawings complies with Rule 83.

> ***3. Claims 12 and 14 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a straight second pipe and a non—uniform cross-sectional shape, does not reasonably provide enablement for a curved second pipe or a non-uniform cross-sectional area, respectively.***

Applicant respectfully traverses the rejection. Section 112 requires, among other things, that the specification contain a written description "to enable any person skilled in the art to which it pertains, or with which is most nearly connected, to make and use the same ..." without undue experimentation. Thus, whether a particular aspect of a patent specification is "enabling" requires reading the specification against the backdrop or context of what was known by a person of ordinary skill in the art at the time the application was filed. *Anjinomoto Co. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 56 USPQ2d 1332 (Fed. Cir. 2000); *see also In re Wright*, 999 F.2d 1560 27 USPQ2d 1510 (Fed. Cir. 1993) ("Nothing more than objective enablement is required and therefore it is irrelevant whether this teaching is provided through broad terminology or illustrative examples.")

The specification as filed, including original claims 12 and 14, disclosed pipes with a uniform cross-section, such as a circular bore, and pipes with a non-uniform cross-section, such as other than a circular bore. The specification as filed, including original claims 12 and 14, also disclosed that substantially straight pipe and curved pipe. More specifically, the paragraph bridging pages 7 and 8 states (emphasis added):

> As can be best seen in FIG. 3, the densimeter 12 has an outer surface 46 and an inner surface 48. The inner surface 48 defines a bore 50 through which fluid can flow. As shown in FIG. 3, the bore 50 has a circular shape as is commonly known in the art. In a preferred embodiment of the present invention, inlet section 14, second section 18, and outlet section 24 all have the same cross-sectional shape, which matches that of the pipeline generally. This cross-sectional shape is uniform and does not vary along the length of the densimeter 12. ***Although the densimeter of the preferred embodiment has a uniform, circular bore, the densimeter would function equally well with any type of cross-section known to the art, such as a non-circular cross-section, an open U-tube that carries the entire flow volume, or a cross-sectional shape that varies along the length of the densimeter 12.*** The density measuring apparatus of the present invention can therefore be adapted for use with any type of pipeline known to the art.

Thus, Applicant submits that a person of ordinary skill in the art as of the application filing date would understand that the subject invention can be made and used with a conduit having a circular as well as a non-circular cross-section, and with a conduit that is straight or curved. The specification as filed is enabled in this regard and claims 12 and 14 are supported. Reconsideration of this rejection is requested.

> ***5. Claims 23—26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent basis for the control means in claims 23 and 24.***

Claim 23 has been amended accordingly. Withdrawal of this rejection is respectfully requested.

> ***7. Claims 1—3, 5-6 and 10—11 rejected under 35 U.S.C. 102(a) as being clearly anticipated by Ence et al (US 6581451)***
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> ***8. Ence et al shows a density measuring device for measuring fluid flowing in the bore of a straight horizontal pipeline including inlet and outlet pipes 6, and a second pipe 4 connected***

> ***at each end to the inlet and outlet pipes via flexible couplings 2. Pipe 4 rests on a weight-measuring unit capable of measuring the weight of the second pipe, where the weight-measuring unit can include a load cell.***
>
> ***10. Claims 4, 7, 13, 15—17 and 20—24 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ence et al.***
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> ***11. Regarding claims 15 and 23—24, although Ence et al doesn't specifically use the term "control unit" for the device 20, it is stated that "the density of the material being transported may be determined by measuring the weight of duct segment 4 with and without material in the airflow" (i.e., fluid). See column 3 lines 26—30. It is also stated at the top of column 4 that to determine the density of material flowing in the pipeline, material-free fluid is transported through duct segment 4 and weighed, and recorded, and then material is introduced into the fluid and reweighed. The difference between the weights is then determined. Thus, if not anticipated as inherent that element 20 constitutes a control unit capable of performing the above mentioned operation, it would have been clearly obvious to one of ordinary skill in the art to record the weights in a computer to perform the subtraction and density determining steps.***

The structure and methods disclosed by *Ence* are significantly different from the structure and methods disclosed and claimed in the subject application. One of the more notable differences is that the subject invention discloses a device and method for measuring the density of a relatively dense, heavy mixture, such as proppant of cement slurries, for use in the oil or gas well. *Ence* neither discloses nor teaches the desirability of measuring the density of such a mixture. Instead, *Ence* teaches a device and method for measuring the density of high-volume, low-weight insulation materials being applied via blowing or spraying. See *Ence*, col. 1, ll 13-25; col. 2, ln 65 to col. 3, ln 15.

To highlight this particular difference, independent claims 1, 5, 15, and 23 have been amended to require that the fluid is for "an oil or gas well." Support for these added recitations may be found in, for example, pages 9 and 10. Because *Ence* does not disclose or teach measuring the density of a fluid for an oil or gas well, independent claims 1, 5, 15, and 23 as amended herein are not anticipated. Further, and assuming without conceding that *Ence* is analogous art, *Ence*'s structure for measuring the density of blown insulation does not render obvious the claimed structure and method for determining the density of fluid for an oil or gas well.

> ***12. Regarding claims 4, 13, and 22, although Ence et al does not specifically state that the cross—sectional area is uniform, one viewing Figure 1 would interpret the cross-sectional area***

> ***to be uniform, or obvious to use a uniform pipe cut out of a standard uniform pipe to save costs.***

Dependent claims 4, 13, and 22 have not been amended in response to this rejection because Applicant contends that independent claims 1, 5, and 15, as amended herein, are patentable and, therefore, dependent claims 4, 13, and 22 are likewise patentable. Reconsideration of this rejection is requested.

> ***13. Regarding claims 7 and 17, the statement that "scale" 20 supports the weight of pipe 4 and measures the weight with a load cell makes obvious, if not inherent, that the load cell is of the compression type.***

Dependent claims 7 and 17 have not been amended in response to this rejection because Applicant contends that independent claims 1 and 5, as amended herein, are patentable and, therefore, dependent claims 7 and 17 are likewise patentable. Because Applicant has not traversed this rejection on the merits, Applicant does not accede to the accuracy of the Examiner's characterization of *Ence*. Reconsideration of this rejection is requested.

> ***14. Claims 8—9, 12, 14, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ence et al as applied to claims 1—7, 10-11, 13, 15—17 and 20—24 above, and further in view of Ford et al (US-4817428)***
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> ***15. Ence et al lacks a teaching of a weight—measuring unit positioned above the second pipe to measure weight via a tension-type load cell, or a second pipe that is curved and not uniform in cross section. However, Ford et al shows a density-measuring device where the pipe section being weighed is curved and has a non-uniform cross section. It further shows a load cell above the pipe to measure tension in line 4.***
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> ***16. It would have been obvious to one of ordinary skill in the art to modify the pipe section 4 of Ence et al to be curved and of non-uniform cross section as taught in Ford et al, since the shape, size and uniformity are not critical to the measurement, so long as the volume of the section being weighed for density measurement is known. Further, it would have been obvious to substitute the tension—type load cell of Ford et al for the compression type of Ence et al as both are known equivalents for determining the same function.***

Applicant respectfully traverses this rejection. Under the guidelines of the MPEP, three basic criteria must be met by the Examiner to establish a *prima facie* case of obviousness. There must be (1) a suggestion or motivation to modify the reference or combine the teachings; (2) a reasonable expectation of success; (3) and a teaching or suggestion of all the claim limitations. MPEP §§ 2142-2143. Further, it "is difficult but necessary that the decision maker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." MPEP § 2141.01, citing *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 7231 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

For references to be combinable, the references themselves must explicitly teach or ***suggest the combination*** as well as the ***potential benefit*** that may be derived from such a combination. *In re Fritch*, 23 USPQ2d 1780 (Fed. Cir. 1991); *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991); *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990); *In re Dillon*, 13 USPQ2d 1337 (Fed. Cir. 1989); *Pipeline Dehydrators, Inc. v. Southeast Pipeline Contractors, Inc.*, 11 USPQ2d 1375 (Fed. Cir. 1989); *Smith Kline Diagnostics, Inc. v. Helena Laboratories Corp.*, 8 USPQ2d 1468 (Fed. Cir. 1988); *Carella v. Starlight Archery*, 231 USPQ 644 (Fed. Cir. 1986); and *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 USPQ 929 (Fed. Cir. 1984). Applicant submits that a *prima facie* case of obviousness has not been made insofar as the Patent Office has not identified any teaching or suggestion within *Ence* and *Ford* for combining the references in the manners suggested.

The *Ford* apparatus purports to measure density of a fluid flowing through a cantilevered pipe section. See *Ford*, col. 1, ll 16-18. The pipe section, whose weight is measured in the *Ford* device, is constrained from any movement whatsoever relative to the adjacent pipework. See *Ford*, col. 3, ll 52-60. Multiple rigid clamps 26, 28 securely attach the cantilevered section to immovable fixtures 22, 24, preventing the transmission of even small movements to the cantilevered section. See *Ford*, col. 3, ll 52-60. In contrast, *Ence* teaches the use of flexible isolation fittings 2 that allow movement of the duct segment 4 with respect to adjacent duct portions 6. See *Ence*, col. 3, ll 25-31.

Ence and *Ford* each represent a system for measuring the density of a fluid. Each apparatus measures the weight of the fluid in a designated section of a pipe or duct. However, each apparatus represents a starkly different approach. Combining the teachings of the references produces an unworkable system that violates basic tenets of each disclosure. The proposed modification or combination would change the principle of operation of the measuring systems in each reference. Therefore, such combination is prohibited. MPEP § 2143.02 (citing *In re Ratti,* 270 F.2d 810 (CCPA 1959). The Examiner is respectfully requested to reconsider the rejection and allow the claims as amended.

> ***17. Claims 25 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ence et al as applied to claim 23 above, and further in view of Carlson (US—6007227) plus Heine et al (US—4285239)***
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> ***18. Ence et al lack a specific teaching of measuring the density while the fluid is in a process pipe on a shipping vessel or truck.***
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> ***19. However, Carlson teaches to measure density of a fluid being processed in a truck—mounted blender, where the densitometer is a nuclear density meter, and Heine et al teaches that a density meter having a weighed pipe section flexibly coupled in a pipeline may be a substitute for a nuclear density meter.***
>
> ***20. Therefore, it would have been obvious to use the density meter of Ence et al as a substitute for the nuclear density meter in Carlson et al on a blender truck as motivated by Heine et al.***

Dependent claims 25 and 26 have not been amended in response to this rejection because Applicant contends that independent claim 23, as amended herein, is patentable and, therefore, claims 25 and 26 are likewise patentable. Because Applicant has not traversed this rejection on the merits, Applicant does not accede to the accuracy of the Examiner's characterization of *Ence, Carlson* or *Heine*. Reconsideration of this rejection is requested.

> ***21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining patents cited show measurement devices for measuring density in a pipeline by weighing a section of a pipe flexibly connected in the pipeline.***

Applicant has no comment at this time concerning the references made of record but not relied on, and does not accede to the Examiner's determination of whether the references are pertinent or analogous.

New Claims

New Claims 27-34 are presented herein to depend from independent claims 1, 5, 15 and 23 as indicated. These claims describe the "fluid" as, among other things, either a "proppant slurry" or a "cement slurry." Support for these claims can be found, for example, in the last paragraph of page 3 and the middle paragraph of page 8.

Conclusion

A fee in the amount of $144 for new claims 27-34 is thought to be due for this paper and its related submissions. If Applicant's belief is in error and one or more fees are due, the Commissioner is hereby authorized to change any fee necessary to make this and related papers timely and effective to deposit account 12-1322 (020569-03100).

Applicant thanks the Examiner for his consideration and effort on this matter and submits that this application is now in condition for allowance. Applicant respectfully requests that a timely Notice of Allowance be issued in this case. The undersigned is available to discuss by telephone this amendment or any other matter pertaining to this file

Respectfully submitted,

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